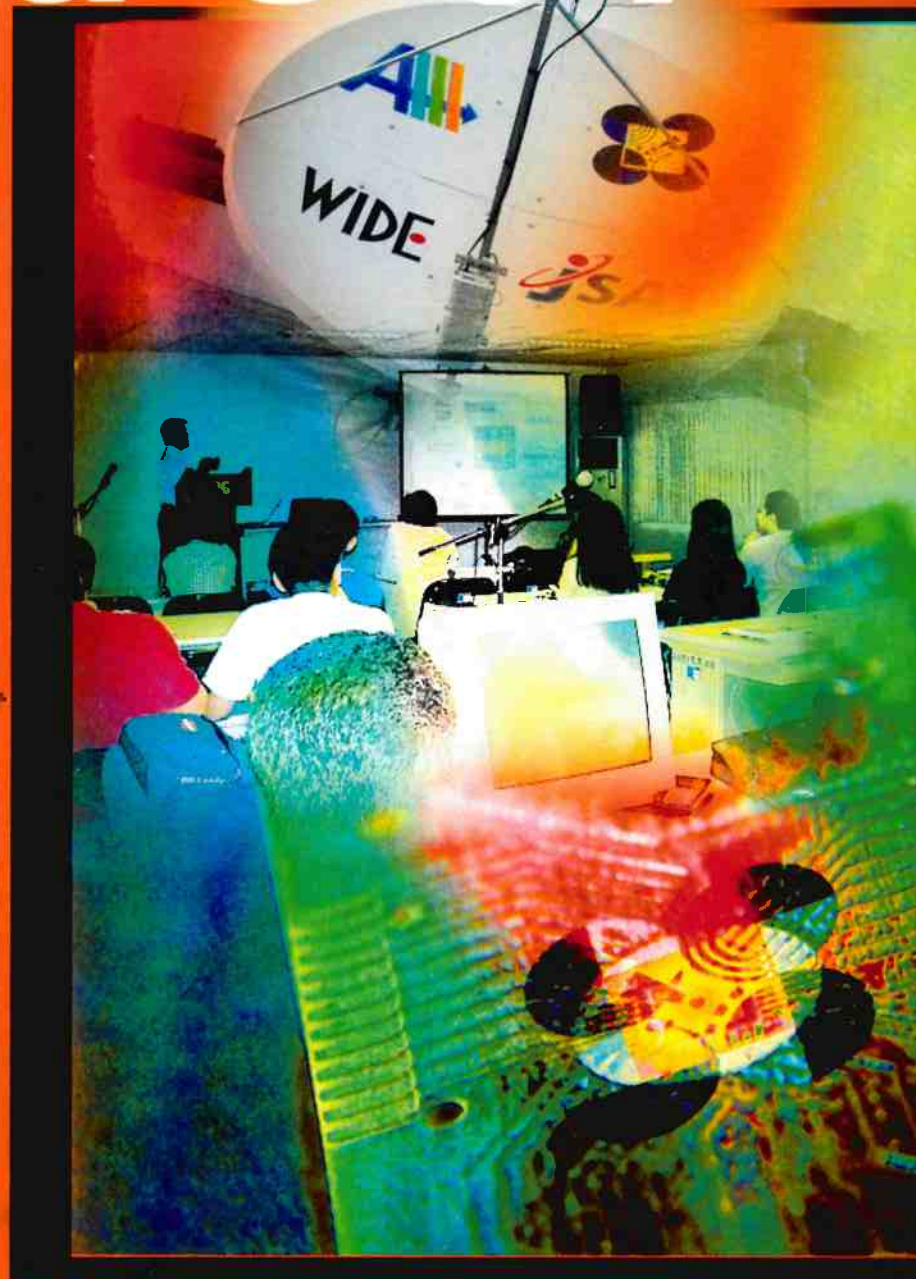




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asti



2001 annual report



Department of Science and Technology

Advanced Science and Technology Institute

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message



The Department of Science and Technology (DOST) is faced with the challenge of intensifying the promotion of Science and Technology within the context of globalization for the benefit of all the Filipino people.

I believe that national development is a difficult dream for us to achieve if we are to remain oblivious of the challenges happening worldwide. It is precisely these changes that should shape the direction and thrusts of DOST. The emergence of Information Technology which is a worldwide phenomenon, has given DOST the means to more effectively promote S&T as the basis for the country's development.

The government's recognition of ICT as the key to finding our niche in the 21st century should be taken as a challenge by ASTI to boost its efforts in ICT and Microelectronics R&D as its contribution to national development.

I congratulate the management and staff of ASTI for your achievements.

May the success of 2001 serve both as a challenge and an inspiration as you sustain your efforts in acquiring new knowledge and new technologies for the development of the Philippine economy.


DR. ESTRELLA F. ALABASTRO
Secretary, DOST

message



I am pleased to present the 2001 Annual Report containing the efforts of the Institute all aimed at finding a place for the Philippines as a leader in this age of the Information and Knowledge Economy.

For 2001, ASTI's R&D activities were focused on developing technologies, services and products in response to the demands of this constantly changing technological environment and most of all in support to the national e-governance thrust and the plans of the Government in using ICT as the key to boost the Philippine economy.

The year was also a preparation of ASTI's celebration of its 15th Year in 2002. In this celebration, the Institute will showcase the capabilities and potentials of the Filipinos to be globally competitive in the areas of ICT and Microelectronics. This milestone in ASTI's existence is our inspiration as we continue to perform our mandate.

In behalf of the ASTI officials and staff, I thank our partners from the government, academe and industry and especially the DOST for their continued support.

Delfin Jay Sabido IX
DR. DELFIN JAY M. SABIDO IX
Officer-In-Charge

Introduction



The **Advanced Science and Technology Institute**

is a line bureau of the Department of Science and Technology (DOST). Its creation was a result of a series of historical events – starting from the EDSA Power I in 1986 that brought into presidency, Corazon C. Aquino, to the elevation of the then National



Science and Technology Authority into cabinet level in 1987 and renaming it the DOST. With the establishment of the DOST by virtue of Executive Order 128 was the creation of line agencies, one of which is ASTI.

ASTI's mandate is to conduct scientific research and development in the advanced fields of studies such as Microelectronics and Information and Communications Technology. It seeks to become a national center of excellence in the area of communications systems by researching technologies and developing products that would reap economic and social rewards to the Philippines, thus improving the quality of life of the Filipinos.

ASTI challenged with the demands of the Information Age and New Economy continuously seeks new and advanced technologies that would make the country globally competitive in the field of ICT and Microelectronics. And in line with the goal of national development, the Institute aims to:

- Establish leadership in our areas of concern by formulating and advocating courses of action for the research, development and adoption of ICT in the Philippines,
- Strengthen and sustain partnership with academe, government, and industry through collaborative Research & Development, and technical training,
- Carry out proactive search and acquisition of strategic and relevant technologies through technology intelligence,
- Conduct proactive assessment of strategic and relevant technologies through market research, and
- Promote the awareness and appreciation of scientific Research & Development.

Highlights of Accomplishments

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Year 2001 was a year of dramatic events that were critical factors in determining the pace of implementation of the Institute's priority projects vis-à-vis the plans and programs of the Philippine Government. The President's appointment of Dr. Estrella Alabastro as DOST Secretary, reinforced the direction of ASTI's priority programs as well as its vision of doing responsive R&D in ICT and Microelectronics. It was a happy year for the Institute considering the declaration of technology as the foundation of economic growth in President Gloria Macapal-Arroyo's State of the Nation Address.

In the middle of the year, its director, Dr. Delfin Jay M. Sabido IX was appointed by the President as Director-General of another DOST agency- the National Computer Center. Functioning concurrently as OIC of ASTI, Dr. Sabido full of dedication and commitment, actively pursued the implementation of the Institute's priority projects. ASTI implemented three of the priority projects under the Comprehensive Program to Enhance Technology Enterprises, which DOST entrusted last year. Components of COMPETE are the Virtual Center for Technology Innovation (VCTI) in Information Technology and VCTI in Microelectronics.

Under VCTI in Information Technology is the **High Performance Research and Education Network: Philippine Research, Education and Government Information Network (PREGINET)** project. PREGINET aims to set up a nationwide broadband network to interconnect academic, government and research institutions with other research and education networks worldwide through the Asia Pacific Advanced Network (APAN). It is envisioned to bridge the digital divide between the urban and rural communities, enable e-governance and most of all facilitate strong R&D collaboration among the government, academe and research communities. One of the major accomplishments of the project is the establishment of exchange and access points in Quezon City, Cebu City, Cagayan de Oro, Davao and Iloilo. These points provide the infrastructure for the operational exchange points needed for the research, education, and government network interconnection. Other accomplishments include the conduct of research on next generation network technologies and services, finalization of the management structure of the project and the conduct of trainings and technology demonstration such as videoconferencing with local and international partners.

Under VCTI in Microelectronics is the **Microelectronics Design for Philippine Electronics Industry, An Essential Component for Global Competitiveness: Establishment of VCTI Microelectronics Design Laboratory**. The project envisions the Philippine electronics industry to remain competitive by developing the technologies that it foresees to be the future trend in design. With the predicted surge of demand for wireless technologies by 2005, research efforts of the project is into the development of a Systems-On-a-Chip (SoC) – which is an integration of all components of various systems, an enabler for future technologies such as Internet appliances, personal communicators, and the like. The project is into the implementation of a 32-bit Reduced Instruction Set Computing (RISC) microprocessor core, which is the "brain" of a SoC. Major accomplishments of the project include the fabrication of a DFT/Viterbi chip. The Viterbi algorithm is used for error-correction in communication systems while DFT is used for on-chip testing of large integrated circuits; establishment of the ASTI-VCTI Open Laboratory, which is equipped with state-of-the-art software tools for full-custom and semi-custom analog and digital IC design and the creation of a new group involved in Analog and Mixed Signal Microelectronics R&D in order to narrow the gap between digital and analog/RF components of the system.

Development of other sub-systems that are needed to complete the SoC is being addressed by the **RF Microelectronics for Wireless Technologies** – another project under VCTI in Microelectronics. The project aims to improve the country's technical capabilities in wireless technologies and develop products and modules for the highly competitive and prospering wireless technology market. Three major research undertakings are carried out to address the devices, system design and application aspects of wireless technologies. Major accomplishments are the design and fabrication of RF components and modules such as RF amplifiers and mixers using TSMC CMOS 0.25-micron process. This allows 0.25 micron as the size of the smallest transistor that can be implemented. The smaller the value, the better is its high-speed performance; design and development of the digital microwave

Highlights of Accomplishments

radio system that allows high-speed wireless transmission of live data from one point to another; and the development of a SDL model of the Bluetooth™ host-side protocol stack, a step in coming up with a Bluetooth™ Software Package.

Aside from the COMPETE projects, the Institute carried out the implementation of R&D activities under its three program thrusts: Information and Communications Technology Program, Microelectronics Program and the Technology Transfer Program.

Under the ICT program, projects implemented were the following: 1) ***Philippine Partnership with the Asian Internet Interconnection Initiatives (AI3)***, which allowed ASTI to do networking research and experimentation activities with Japan and other AI3 country partners like Thailand, Indonesia, Hong Kong, Malaysia, Singapore, Sri Lanka and Vietnam. This partnership is very essential considering the establishment of PREGINET; 2) ***Management Information System***, a centralized, online, paperless transaction system developed to make fast and efficient office operations; 3) ***Development and Implementation of an Open Source System for Workstations and Servers***, aimed to develop and implement an intranet running on open-source programs considering the constant rise of software and licensing costs. ASTI's open source team conducted research on existing open source operating systems and software applications to eventually produce the Institute's own open source software, and 4) ***Cooperative Venture for the Enhancement and Y2K Compliance of PAGASA's Meteorological Data Communication Systems***, developed was a software which will provide PAGASA with reliable and efficient means of gathering accurate and timely weather data.

Under the Microelectronics Program, projects implemented were the following: 1) ***Process Development for Multilayer Printed Circuit Board Fabrication***, aimed at further enhancing the prototyping capabilities of the Institute, 2) ***Setting Up of a Manual Soldering Facility for Surface Mount Assemblies***, established to provide small quantity, quick turn-around assembly service for ASTI projects, and 3) ***PCB Lay-out Design***, addressed the first stage of prototype fabrication established to provide the need of the Institute for lay-out design of its projects and eventually aimed at developing the local layouting skills. ASTI is a member of the IPC, an international organization of circuit designers, manufacturers and suppliers for the electronics industry.

Under the Technology Transfer Program, consultancy services, technical services and training and seminars were conducted to transfer R&D outputs to the government, academe and industry.

One of the major services offered by the Institute is the ***.gov.PH Domain Registry Maintenance and Administration***. This is open for registration of domain names of Philippine governmental agencies only, subject to the Philippine Government Internet Domain Names Policy. A total of 92 clients from the city, municipal and provincial government as well as top-level government institutions were served for the year. Said service was extended free of charge.

Having focused its R&D activities in ICT and Microelectronics, the Institute realized the significance of changing its logo to make it more representative of its research focus. By May 2001, a contest was held on the new ASTI logo. The new logo will be launched in time with its 15th Anniversary celebration.

With all these accomplishments and with the Institutes celebration of 15 years of doing R&D in ICT and Microelectronics by 2002, the Institute is challenged to boost its efforts to find a place for the Philippines as a leader in this fast changing global technological environment.

Implementation of High Priority Flagship Programs

Current Status
of PREGINET

3 Exchange Points
5 Access Points

512 Kbps Leased Line (PLDT)

12 MHz Transponder (TELOF)



7

Flagship Projects under Comprehensive Program to Enhance Technology Enterprises (COMPETE)

High Performance Research and Education Network: Philippine Research, Education, and Government Information Network (PREGINET)

PREGINET aims to set up a nationwide broadband network to interconnect academic, government and research institutions with other research and education networks worldwide through the Asia Pacific Advanced Network (APAN). Using high-speed links from the Telecommunications Office of the Department of Transportation and Communications, the project will initially establish its presence in eight regions in Visayas and Mindanao and eventually all over the country.

PREGINET is involved in the research and development of networking technologies, applications, and services essential for the continuing evolution of the Internet. Current research activities are focused on IPv6 which addresses the limitations of the current Internet protocol, IPv4; Multimedia over IP which intends to deploy H.323 as a standard network service for the research and academic community to provide distance learning, telemedicine, and other uses of videoconferencing; Network Measurements which involve the use of network monitoring tools and systems to determine the network status and to measure the performance of various services and applications under test; and Network Infrastructure which deals with the establishment of the PREGINET nationwide network and the study of different wire and wireless broadband network technologies.

Virtual Center for Technology Innovation (VCTI) in Information Technology will set up a manpower and R&D foundation that will pursue specific objectives such as training and certifying at least 5,000 IT Professionals by 2004, support for technology transfer and adaptation, and the promotion of high-value IT products and services. Among the policies and programs the foundation will undertake are continuing IT education courses, setting-up an IT Fund for government computerization and drawing up schemes for strategic partnerships and alliances between local companies and international technology providers. Representatives from academe, R&D agencies and industry constitute the management team of the foundation.

So far, the project has accomplished the following:

➤ Establishment of exchange points for research, education, and government institutions

- Identified network main exchange points and regional access points;
- Completed network infrastructure diagram;
- Secured approval of frequency license applications from NTC on broadband network and satellite transmission;
- Conducted survey/meeting with partners in Visayas and Mindanao region (Cebu, Davao, Cagayan de Oro and Leyte) last October 24-28, 2000;
- Visited DOTC-TELOF sites and DOST Regional Offices in regions 7,8,10,11;
- Convened meetings on partnership of ASTI and DOTC-TELOF for the use of TELOF transmission facilities;
- Acquired sponsorship of 2 MHz transponder bandwidth for one year from the Agila II satellite of PLDT-Mabuhay;
- Established the exchange points located in Quezon City, Cebu City, and Cagayan de Oro City; and
- Established 5 access points located in Quezon City, Cebu, Cagayan de Oro, Davao, and Iloilo.

➤ Development of a next generation network testbed to connect universities, research institutions to demonstrate new technologies and support future research

- Reviewed and assessed VSAT equipment; and
- Acquired network equipment used for simulation testing for test deployment.



Implementation of High

- Conduct of research on next generation network technologies and services
 - Conducted research on network technologies and applications;
 - Operationalized the IPv6 Network Testbed;
<http://www.ipv6.asti.dost.gov.ph>
 - Completed Network Monitoring deployment;
<http://netmon.asti.dost.gov.ph>
 - Operationalized the Multimedia Testbed;
 - Acquired VCON Terminal and Gatekeeper for multimedia testing; and
 - Acquired ATM Networks competency
- Setting-up of the project management system
 - Finalized the Management structure of PREGINET;
 - Prepared briefing papers for partners and MOU among ASTI, DOST Regional Offices and partner institutions;
 - Updated and operationalized the PREGINET project website
<http://preginet.asti.dost.gov.ph>
- Conduct of training and technology demonstration
 - Demonstrated the video conferencing capabilities with local partners (PCARRD, Phivolcs, UP EEE, UP Manila)
 - Conducted videoconferencing with APAN and SingaREN partners

Microelectronics Design for Philippine Electronics Industry, An Essential Component for Global Competitiveness: Establishment of VCTI Microelectronics Design Laboratory

To remain competitive, the Philippine electronics industry must be able to design systems that use cheaper, smaller, and faster components. Since these designs take five to six years to develop, the VCTI-Microelectronics Design Laboratory will develop the technologies that it foresees to be the future trend in design. Current research activities of the team are geared towards the development of Systems-On-a-Chip (SoC), which is seen as an enabler for future technologies such as Internet appliances, personal communicators, and the like.

In order to demonstrate that electronics design can certainly be done locally, the project team at ASTI continued its efforts in implementing a 32-bit Reduced Instruction Set Computing (RISC) microprocessor core. Among the major activities carried out to develop the RISC are the following: a) VHDL coding and synthesis; b) Lay-out and verification; and c) System integration and test. Some of the significant outputs generated were the DFT/Viterbi chip that was fabricated in Taiwan and the seven technical papers that were published and presented in various local and international conferences. These conferences and publications include the International HDL Conference held at Sta. Clara, U.S.A.; the Second National ECE Conference; and the Philippine Engineering Journal.

Virtual Center for Technology Innovation in Microelectronics will help build local capability in the design, fabrication and testing of Application Specific Integrated Circuits (ASICs), and development and production of electronic products. In all stages of product development, the VCTI will make available its testing facilities which, coupled with the training in ASIC design and advanced materials, will provide the push to shift the direction of the local microelectronics industry from product assembly to the development of locally designed and manufactured technology products. Among the partners for this endeavor are prominent institutions in the academe and government, and leading firms in the electronics industry.



A new group involved in Analog and Mixed Signal Microelectronics was formed to conduct research, which would narrow the gap between Digital and RF Microelectronics. The group has been studying how to use the Very high speed integrated circuit Hardware Description Language – Analog and Mixed Signal (VHDL- AMS) in modeling circuits.

In terms of developing a skilled workforce adept in IC design, several technical seminars were conducted at ASTI, Mindanao State University–Iligan Institute of Technology in Iligan City, University of San Carlos in Cebu City, and Saint Louis University in Baguio City. These seminars focused on Digital Design Using Very High Speed Integrated Circuit Hardware Description Language (VHDL). A total of 75 faculty members from 17 academic institutions in Manila, Iligan City, Cebu City, and Baguio City were trained. Also conducted last year was the Cadence Design Solutions 2001. A total of 136 participants attended the said event.

A proposal to conduct roadshow training on VLSI Design using Alliance, an open source/free ware IC design tool, was also developed. Faculty members of various universities in the country will be trained and in return are expected to include VLSI Design in their curriculum. A CD containing the Alliance VLSI CAD System, technical documentation, user's manual and installation procedures will also be distributed to participating universities.

Finally, the IC design center housed at ASTI, which is now called "ASTI-VCTI Open Laboratory", is now available to industry, academe, and government institutions to catalyze advancements in Microelectronics research in the country. The laboratory is equipped with state-of-the-art software tools for full-custom and semi-custom analog and digital IC design. It will also offer lectures and seminars for design engineers, students, and IC design enthusiasts.

Radio Frequency (RF) Microelectronics for Wireless Technologies

This project aims to improve the country's technical capabilities in wireless technologies and in the process, develop products and modules for the highly competitive and prospering wireless technology market. In pursuit of this objective, research activities were carried out at various levels:

Device Level : Design of Radio Frequency Integrated Circuits

System Level: Broadband System Design

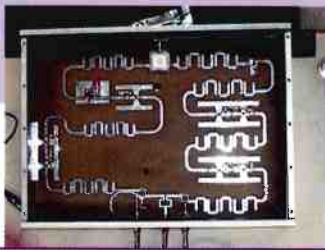
Application Level: Software Application Development for Wireless Systems

❖ Radio Frequency Integrated Circuits (RFICs)

Research at the device level focuses on the design of radio frequency integrated circuits (RFICs) for wireless devices, such as mobile phones, and Internet appliances. Because RFIC design is a relatively novel field in the country, capability building in this area is done by conducting intensive study of the concepts, obtaining training, and, performing actual design work.

To fully enhance the technical skills of the researchers and engineers involved in the project, Cadence conducted a three-day training through webcast in July 2001. The training, which consisted of lectures and laboratory work, focused on the use of SpectreRF software in simulating RF circuits. The project team was also represented in the 9th International Symposium on Integrated Circuits, which was held in Singapore in September 2001. The symposium was a venue for keeping updated on the latest technologies in the field and was essential in gauging how local research stand in relation to the technical community.

The researchers studied and gained proficiency in the use of industry-standard design tools and had gone through the different stages of RFIC design flow including schematic entry, simulation, layout, and verification. RF components and modules such as RF amplifiers and mixers were designed and fabricated using TSMC CMOS 0.25-micron process last June 2001.



Implementation of High

As a product of the design and implementation of the modules, technical papers were presented to local and international conferences: the 6th ASEAN Science and Technology Week Conferences held in Brunei Darussalam, the World Conference on Science and Technology in Manila, and the 2nd National ECE Conference.

❖ Digital Microwave Radio or DMR

Research at the system level focuses on the design and development of the digital microwave radio system, with particular emphasis on these three areas of discipline, namely: a) Error Correction Coding, b) Radio Frequency (RF) / Microwave Circuit Design, and c) Digital Signal Processing or DSP. With the insatiable demand of consumers for high bandwidth applications has driven the project team to come up with novel and cost effective ways of delivering high-speed data. Last year's accomplishments as far as these three areas are concerned are as follows:

➤ Error Correction Coding

- Completed the development and implementation of 1/2 rate Viterbi Decoder; and
- Finished the VHDL code for the Reed-Solomon encoder/decoder.

➤ RF/Microwave Circuit Design

- Finished the RF modules for wireless testing;
- Completed the single board upconverter and downconverter; and
- Accomplished the integration and packaging of a 4-channel sub-carrier multiplex (SCM) system.

➤ Digital Signal Processing

- Back-to-back testing of $\pi/4$ – DQPSK modem;
- Finished the DSP modem and digital filter on FPGA; and
- BER testing of DSP modem

At the system level, in-house testing of BPSK with Viterbi codes was done. Wireless testing of video transmission from ASTI to UP Electrical and Electronics Engineering building was successfully conducted. Once fully integrated and tested, the DMR system can be eventually used to connect remote areas in the Philippines through PREGINET.

Based on the research experiments done, four scientific papers were accepted and presented at the International Microwave Symposium in Arizona, U.S.A., 6th ASEAN Science and Technology Week in Brunei Darussalam, and 2nd National ECE Conference in Manila.

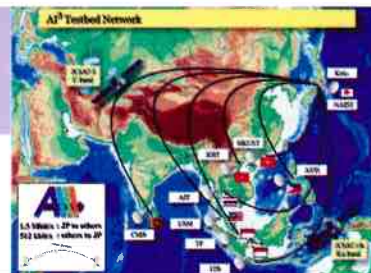
❖ Bluetooth™ Host-Side Protocol Stack

Research at the application level focuses on software application development for wireless systems. With the end goal of enhancing the technical capabilities of Filipino engineers and programmers in software development and enabling local software industry develop original, innovative, and competitive software implementations, ASTI started the implementation of this project which will ultimately come up with a Bluetooth™ Software package. The initial SDL model of the Bluetooth™ host-side protocol stack core layers was developed in July 2001. Later in the year, the SDL architecture was optimized and the target-side layers of the protocol were added in the model.

To equip the project team with the necessary technical knowledge before proceeding to the development of higher layers host-side protocols, in-house training on Object Geode was conducted. Object Geode is a software development tool being used in the project.

Priority Flagship Programs

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Transfer of knowledge through conduct of trainings and seminars was also one of the priority activities of the project. The seminar entitled "No Strings Attached: An Eye-opener on the Bluetooth™ Wireless Technology" was successfully conducted for U.P. Diliman's Electrical and Electronics Engineering students. This was followed by another seminar for engineering students of the University of Santo Tomas.

All these R&D efforts were recognized in some publications and conferences. One technical paper was published on the Philippine Engineering Journal and another one was presented during the 2nd ECE Conference in November 2001.

Information and Communications Technology (ICT) Program

Philippine Partnership with the Asian Internet Interconnection Initiatives (AI3)

The AI3 Project is a Japanese research initiative whose aim is to build a testbed for networking research and experimentation in Asia by providing country partners (i.e. Japan, Thailand, Indonesia, Hong Kong, Philippines, Malaysia, Singapore, Sri Lanka, Vietnam) with free access to a JCSAT-3 satellite transponder. ASTI through this DOST-PCASTRD-assisted project, established the Philippine AI3 Phase II node (local AI3 gateway) by setting up an earth station and linking it with the AI3 network hub in Japan. All other local participating institutions access this AI3 gateway using existing as well as planned local links/networks.

Research experiments have been and are still being conducted by the AI3 partners in the areas of IP version 6 (IPv6), multicast transmission over IP, traffic analysis, Ku-band link testing, video conferencing, satellite video broadcasting and distance learning. Much of the results of these experiments, particularly for satellite video broadcasting and conferencing as well as distance learning, are very significant and applicable to the Philippines.

At ASTI, the following R&D activities were done over the AI3 network: a) Development and Testing of Link Monitoring and Performance Measurement Tools; b) Optimization Experiments; c) MBONE Experiments; d) 6BONE Experiments; e) Distance Learning; and f) Routing Experiments. Results of these research experiments were documented in various technical reports and were presented in different scientific meetings and conferences held locally and abroad. A total of six technical papers/reports were prepared this year.

Moreso, the project team organized the Symposium on Developing the Next Generation Internet in the Philippines, the speakers of which included technical experts from the AI3 project partners. ASTI also hosted the AI3 Spring meeting, a technical meeting of researchers from AI3 partner countries.

The support provided by DOST and PCASTRD has been key to the successful partnership by the Philippines (through ASTI) with the AI3 Project since September 1999. Although the financial assistance of these institutions to this project was brought to an end, the Philippine partnership with AI3 and research activities using the AI3

ICT Program shall address the COMPETE Program of DOST. It consists of three components, namely: Advanced Network Research, Wireless Technologies and Network Applications and Software. The Advanced Network Research component seeks to develop competency in advanced networking technology, services, applications, and architecture; establish a national research and education network; develop, deploy, adapt, and adopt strategic networking technologies, services and applications. The Wireless Technologies component aims to develop capability in fundamental design and implementation of industrial grade modules of wireless communications systems to a skill level that is able to produce world-class innovative wireless technologies. Finally, the Network Applications and Software component strives to develop expertise in software development in network applications to be able to produce marketable software and firmware products.



Implementation of High

network will continue through the Philippine Research, Education, and Government Information Network (PREGINET). PREGINET and AI3 are interconnected so that PREGINET partners automatically have access to AI3. With this, the value of the Philippines' partnership with AI3 continues to increase since more local research and education institutions are able to benefit from it.

Management Information System

ASTI-MIS is a multi-tier system that was developed to automate most of the administrative activities/transactions. The system consists of two major systems, namely: Personnel Management Information System (PMIS) and File Centralization and Organization Information System (FCOIS). PMIS is used for managing records of employees. It includes the following subsystems:

1. Daily Time Record
2. Job Application
3. Leave
4. Plantilla
5. Position
6. Promotion
7. Service Record
8. Resignation
9. Users Account

FCOIS is used to store and track documents or records within an organization. It has three subsystems: Document Tracking, Archives/Filing Cabinet and Contacts.

ASTI-MIS is also consists of Specialized Information Systems like Domain Registry, Web Calendar, Project Archives and Users Survey

Insofar as the status of the development of ASTI-MIS is concerned, the following milestones have been achieved:

- Demo presentation of PMIS, FCOIS, and Specialized Information Systems to various DOST agencies like ITDI, PCIERD, PCASTRD, FNRI, PCAMRD, MIRDC and PCARRD
- Preparation of technical documentation and user's manual. Due to the promising results of the ASTI-MIS, the DOST decided to adopt this system. Hence, the project team at ASTI pursued some refinements of the system to customize it to the requirements of the DOST agencies. Here are some of the activities done as regards the DOST-MIS:
- Completion of DOST PMIS and DTIS
- Demo presentation of PMIS and DTIS in ASTI and DOST agencies, namely ITDI, PCIERD, PCASTRD, PCAMRD, FNRI, MIRDC and PCARRD
- Preparation of technical documentation and users manual
- Pilot testing of PMIS and FCOIS to PCARRD
- Successful installation of Information Systems in DOST
- Completion of Compaq Database Server (for DOST-MIS) installation and configuration
- Updating and having MIS 2 information system server online
- Amendment of the MOA between ASTI and DOST

Other activities of the team during the year included the following:

- Conduct of online user survey to determine the allocation of computing resources and identify training needs



Priority Flagship Programs

- Conduct of training/lecture on Basic HTML, MS Project, Web Animation, Star Impress and Basic Computer Maintenance for ASTI staff and PSYWP trainees
- Formulation of a 5 year plan for the project
- Renumbering of IP addresses
- Launching of new ASTI Website and ASTI project websites
- Completion of debugging of dns.gov.ph website
- Formation of Webmasters pool for website update
- Preparation of IPv6 implementation plan
- Installation of Demolib for the Library System

Development and Implementation of an Open Source System for Workstations and Servers

This project aims to develop and implement an intranet running on open-source programs and applications. A distribution package consisting of installation disks (source codes), administrative manual, and other documentation will be produced. Among the target beneficiaries of this project are public high schools and universities, local government units, small and medium enterprises, and the national government. Exposure to open source software will enable the students to have access to the original source code of the applications they are using and allow them develop and enhance their software development skills by experimenting on ways to improve the software. This project also hopes to address the lack of awareness in the existence of open source systems and the lack of persons trained in the use and administration of these software which limit the degree of computerization in schools, small and medium businesses, as well as government offices.

Among the project activities accomplished are the following:

- Preliminary research on existing open source operating systems and software applications
- Gathering of statistics on independent studies regarding open source systems
- Familiarization with UNIX
- Preparation of initial draft of criteria for evaluation of operating system
- Formulation of list of Applications to be evaluated
- Pre-qualification and selection of Linux operating system for further experimentation
- Setting up of Open Source Laboratory
- Enhancement of the Open Source Laboratory by standardizing hardware specifications of all PCs
- Development of Open Source syllabus/course outline for trainings/lectures
- Meeting with PLUG members which resulted in possible collaboration in developing an installation disk of open source applications for government institution and academe
- Setting up of online poll on ASTI website
- Receipt of old PC donation from JP-Morgan CHASE Philippines

Cooperative Venture for the Enhancement and Y2K Compliance of PAGASA's Meteorological Data Communication Systems

ASTI developed the software that is adaptable to the existing computers and processors of PAGASA. The software is automatic and is capable of controlling remote hardware and communication equipment. The system, which will provide PAGASA with reliable and efficient means of gathering accurate and timely weather data was already completed.

Other potential use of the system is on the extension of the Internet to very remote locations and islands of the country. It can provide Internet email service over HF radio communications systems.



Implementation of High Priority Flagship Programs

Microelectronics Program

Process Development for Multilayer Printed Circuit Board Fabrication

For some years now, the SPD PCB laboratory has been catering to the prototyping needs of the institute. In addition to this, the lab opened its doors to PCB fabrication requests from various academic institutes and local firms. As an initial offering, the PCB lab catered to single and double-sided PCB requests.

To further widen the lab's capability and to meet the prototyping requirements of ASTI, SPD has experimented on putting up a multilayer PCB line in addition to its single and double-sided capability. SPD initially worked out a "hybrid" process for the line by incorporating the milling and dry film processes. The rationale behind the hybrid process is to make layer alignment easier

However, the hybrid process has lots of limitations. The ultimate goal is to develop a working process that uses dry film technology only. SPD has conducted several experiments in the hope of finding an acceptable way for aligning the layers – perceived to be the bottleneck of the project.

To date, SPD is coming close to having a stable working process for alignment. On top of this, the project team is also gaining necessary experience to develop and fabricate multilayer PCB. The project is foreseen to be finished by the first quarter of 2002.

Setting Up of a Manual Soldering Facility for Surface Mount Assemblies

The manual SMD soldering facility was established to provide small quantity, quick turn-around assembly service for ASTI projects. A set of guidelines and standards for the operational activities of the facility are now in place. To maintain the staff's skill level, regular practice sessions were scheduled.

This facility is a major piece in SPD's mission of providing a complete prototyping service, one that covers layout, PCB fabrication and assembly.

PCB Lay-out Design

The Special Projects Division has a Circuit Layout Design team which addresses the first stage of prototype fabrication. Using industry proven software, schematic entries are transformed to manufacturable circuit designs as guided by conventional knowledge and internationally accepted standards for layout. With the group's effort, ASTI has become a member of the IPC, an international organization of circuit designers, manufacturers and suppliers for the electronics industry. Now, ASTI has access to IPC standards which the Institute uses to improve and refine its layouting capability. It is the team's immediate goal to learn Design for Manufacturability (DFM) and Design for Test (DFT) as these are important components of Product Development.

To put theory into practice, the team has been engaged in several layout work for a variety of ASTI projects. Once the team acquires confidence and mastery, the team plans to service the local industry and play an important role in the development of local layouting skills through trainings and seminars.

The Microelectronics Program also targets to achieve the goals of COMPETE. It intends to set-up a state-of-the-art microelectronics design facility where one can do quality R&D work; cultivate a skilled workforce adept in IC design through training and exposure to actual design work; and develop system-on-a-chip (SOC) capability within three years. Specific activities being undertaken include research on low-power design and MEMS, study options for design flow using freeware, production of ARM chip, among others. Having envisioned to do projects that "cross divisional boundaries", for 2001-2005, all technical divisions of ASTI will be consolidating their efforts to come up with the country's first system-on-a-chip – an integration of all components of wireless devices- for wireless technologies. This is in response to the predicted surge of demand for wireless devices in 2005.

Improvement of S&T Governance, Management and Linkages

15

ASEAN Committee on Science and Technology (COST) and the Sub-Committee on Microelectronics and Information Technology

ASTI represents the country in the ASEAN Sub-Committee on Microelectronics and Information Technology (ASEAN-SCMIT) that is under the ASEAN Committee on Science and Technology (ASEAN-COST).

The ASEAN-COST serves as the central mechanism for ASEAN cooperation in science and technology. Established in 1978 its primary task is to initiate and promote ASEAN cooperative programmes to promote and intensify cooperation in the scientific and technological activities on common problems in the region and raise the level of technological and scientific advancement in member countries.

Programmes and projects proposed through the Committee are being coordinated, evaluated and implemented by through COST Sub-committees.

Information Technology and Electronic Commerce Council (ITECC)

ASTI sits as a member of the Human Resource Cluster and the Physical Infrastructure Cluster of the Information Technology and Electronic Commerce Council or ITECC.

ITECC formed under Executive Order No. 264 is mandated to transform the Philippines into a knowledge-based economy by harnessing the potentials of information and communications technology, most especially pushing the development of e-commerce in the country. It is a council of government and private sectors headed by the President.

Aside from being a member of these two important bodies, ASTI also attends in special international meetings and mission in order to establish partnerships and linkages, which are very vital in sustaining the R&D efforts of the Institute. Meetings attended include:

Asia-Pacific Advanced Network (APAN) Meeting

APAN is a non-profit international consortium to provide networking environment for research and development on advanced applications and services. APAN is one of the Institute's partners in the PREGINET project.

Asian Internet Interconnection Initiatives (AI3) Meeting

The AI3 Project is a Japanese research initiative whose aim is to build a testbed for networking research and experimentation in Asia by providing country partners (i.e. Japan, Thailand, Indonesia, Hong Kong, Philippines, Malaysia, Singapore, Sri Lanka, Vietnam) with free access to a JCSAT-3 satellite transponder.

With the Philippines being a part of AI3, the country's research and academic institutions like UP, Phivolcs and IRRI are able to participate in networking research and experimentation conducted by the AI3.

Philippine Trade and Investment Mission To Europe

The mission aimed to promote Philippine IT expertise and capabilities in mobile application, software development, e-Services and IT-enabled services and push forward the implementation of the MOU between the Philippines' BOI and the SOFI that identifies IT as a priority sector. The mission was undertaken covering the cities of Stockholm, Helsinki, Rotterdam, London, Berlin, Munich, Geneva and Zurich.



Strengthening and Sharpening

Technology Transfer Program

Consultancy Services

Fisheries Resource Management Project (FRMP)

An amendment and addendum to the original Memorandum of Agreement between ASTI and BFAR was signed. The amendment stipulates that the consultancy services to be provided by institute to the FRMP will be extended until December 2001. All provisions of the agreement were successfully met. ASTI researchers were able to develop the technical plans and specifications of the radio communication system, which was already submitted to BFAR. The institute also assisted BFAR project team in the bidding process (pre-bid, opening of bids, and technical evaluation) for the necessary communications equipment. The consultancy service provided to BFAR was formally concluded last December 2001.

Technical Services

Printed Circuit Board (PCB) Fabrication

ASTI through the Special Projects Division, provided PCB fabrication services to various local firms and academic institutions. These include Amkor Anam, Grand Circuit Industry Philippines, Eazix, the UP department of Electrical and Electronics Engineering among others.

To further satisfy its clients, SPD is continuously improving upon its services through process and quality related activities.

.gov.ph Domain Registry Management and Administration

One of the major services and activities of the Institute is management and administration of the .gov.ph domain registry. This service is provided by the Institute in behalf of the Department of Science and Technology to whom this responsibility was delegated.

The .gov.ph domain is for registration of Philippine governmental agencies only.

As part of the Institute's effort on e-governance, a government organization can register its domain name on-line at <http://dns.gov.ph>, subject to the Philippine Government Internet Domain Names Policy.

For this year, a total of 92 clients from the city, municipal and provincial government as well as national government agencies were served. Said service is currently provided free of charge.

The **Technology Transfer Program** pursues dynamic assimilation of research results by industry, academe, NGO's and government instrumentality. It aims to transfer R&D outputs and advanced/specialized know-how through: (1) Technology diffusion/commercialization; (2) Collaborative R&D; (3) Conduct of training and seminars; and (4) Industry studies.

The creation of the **Business Development Unit** or BDU, whose main function is to develop a marketing plan/strategy for promising technologies developed at ASTI, strengthens the implementation of the program. BDU's birth on November 2000 promised an organized, systematic and strategic technology transfer program for the Institute. Specific tasks of the unit include building relationships with potential partners for the Institute and looking into Intellectual Property Rights, Non-Disclosure Agreements, licensing, valuation, among others.

Focus of Continuing Programs



17

Trainings/Seminars

In terms of developing a skilled workforce adept in ICT and Microelectronics and transferring knowledge, several technical seminars were conducted. These activities were also a way of promoting the research efforts of the institute. These include the following:

Four (4) Seminars on Digital Design Using Very High Speed Integrated Circuit Hardware Description Language (VHDL) IC Design Training	<ul style="list-style-type: none"> ú ASTI, Mindanao State University–Iligan Institute of Technology in Iligan City, University of San Carlos in Cebu City, and Saint Louis University in Baguio City. ú Seventy-five (75) faculty members from 17 academic institutions in Manila, Iligan City, Cebu City, and Baguio City
Cadence Design Solutions 2001 (coorganized with Cadence, Singapore)	136 participants
No Strings Attached: An Eye-opener on the Bluetooth™ Wireless Technology"	UP Diliman's Electrical and Electronics engineering students
UST ECE Week 2002 technology talks on wireless technologies: <ol style="list-style-type: none"> 1. Bluetooth Technology Seminar 2. Broadband wireless System Design 3. RF Integrated Circuit Design 	
Symposium on Developing the Next Generation Internet in the Philippines	121 participants from the government, academe and industry.
Training on Personnel Management Information System (PMIS) and Document Tracking Information System (DTIS) for DOST agencies	
PSYWP Training	27 students from the different colleges in Luzon
Technologies for the Next Generation Internet: An Overview	14 participants from the Government and Academe
Naming and the Domain Naming System	27 participants from different government agencies
I.T. Confab 2001 in partnership with STAC-J Philippines	12 participants from the government and academe



Strengthening and Sharpening

Access to Facilities

The Institute has been a favorite destination of engineering students from the different regions of the country. Not only students visited the institute but also IT specialists both local and foreign and ASTI's partners from the government, academe and industry. Visitors were toured to the four technical divisions and were able to see the technical staff doing their projects.

Students, teachers, engineers and researchers have frequently visited the library in order to have access to its wide collection of engineering and computer books, scientific journals and other periodicals.

ASTI also provided its facilities and equipments to the government, academe and industry for their projects and researchers.

S&T Promotion

As a means of promoting the R&D efforts of the Institute, ASTI actively participated in technology fairs and exhibitions. ASTI were able to showcase its programs and projects in the following exhibition: 2001 NSTW, e.SERVICES.Philippines, E-ducationtech 2001 and CommAsia.

ASTI also disseminated printed materials like annual reports, brochures, press release, as well as do interviews and presentations of technical papers in both local and foreign conferences.

Among the technical papers printed and presented by the Institute for the Year 2001 are the following:

Papers published in journals/proceedings:

Philippine Engineering Journal (PEJ), Volume XXII, Number 1: June 2001

- "Bluetooth host-Side Protocol Stack Development Using Formal Description Techniques" by I. Wong, B. Galang, M. Caccam, C. Dideles
- "Practical Design Techniques for FR4 Material-Based Microwave Hairpin Filters" by N. G. Toledo

International HDL Conference and Exhibition

Santa Clara, California, U.S.A.

January 9, 2001

- "A Comparison of Implementing a Convolutional Error-Correcting Coder-Decoder as an ASIC and an FPGA" by M.M. Tabangcura and A.A. Chio

Institute of Electrical and Electronics Engineering Microwave Theory and Techniques Society (IEEE MTT-S) International Microwave Symposium (IMS 2001)

Phoenix, Arizona, USA

May 20-25, 2001

- "Design and Characterization of a Low Cost ISM- Band Sub Carrier Multiplexed Broadband Digital Microwave Link" by N.G. Toledo



Proceedings of the Asia Pacific Advanced Network (APAN) Conference 2001

Penang, Malaysia

Aug. 20-23, 2001

- "IPv6 Deployment to the University of the Philippines through the Advanced Science and Technology Institute" by C.M. R. Camus, C.G. P. Quiblat, C.W. C. Gueco, and D. F. Villorente

Other papers published:

- "Proceedings of the Symposium on Developing the Next Generation Internet in the Philippines" by C.W. C. Gueco, C.M. R. Camus
- "Monitoring the SDM300A Satellite Modem" by J.R. Landicho, and C.G. P. Quiblat
- "ASTI IPv6 Working Group Activity Report" by C.M. R. Camus, C.W. C. Gueco, and C.G. P. Quiblat

Technical Papers Presented in symposia, conferences, meetings:

Institute of Electrical and Electronics Engineering Microwave Theory and Techniques Society (IEEE MTT-S) International Microwave Symposium (IMS 2001)

U.S.A.

May 5-25, 2001

- "Design and Characterization of a Low-Cost ISM-Band Sub Carrier Multiplexed Broadband Digital Microwave Radio Link" by N. G. Toledo

Batak Science Community Week 2001 Technology Symposium

Batac, Ilocos Norte

July 4, 2001

- "Research and Education Internetworks: Technology and Applications" by D. F. Villorente

National Science and Technology Week (NSTW) 2001 Scientific Meeting

July 19, 2001

- "Internet over Satellite: The AI3 Experience and Ongoing Work" by D. F. Villorente

World Conference on S&T

Manila Hotel

Sept. 13 – 15, 2001

- "Design of RF Integrated Circuits at 2.4 GHz Using 0.25 Micron CMOS Technology" by I.V. Beleno, P.P. I. Andres, M.A. B. Borlongan, A. L. de Guzman, M.M. Fernandez, L.T. Sison



Strengthening and Sharpening Focus of Continuing Programs

6th ASEAN S&T Week Conference

Brunei Darussalam

Sept. 17-21, 2001

- "Design and Implementation of p/4-DQPSK Modem for Broadband Wireless Access" by A.M. Manlapat, C.G. Santos, and J. Ifurung
- "Design of a 0.25-Micron, 2.4 GHz CMOS RF Microelectronics Components" by I.V. Beleno, P.P. I. Andres, M.A. B. Borlongan, A. L. de Guzman, M.M. Fernandez, and L.T. Sison
- "Design of All-Optical Routers for Very High Speed Communication Networks" by D.J. Sabido IX, J. Caisido, J. Serafica, and D. Carlos
- "I.T. and Microelectronics R&D in the Philippines: Research Innovations at the Advanced Science and Technology Institute" by D.J.M. Sabido IX, N.J.C. Castaneda, M.A.S. Gopalan, and C.R. Vargas

2nd National ECE Conference

November 2001

Univ. of Santo Tomas, Manila

- "Interoperability of H.323 Clients" by J. Layno, L. Larin, J.M. Manlapig
- "Implementation of Gaussian Filters for a 0.25-Micron CMOS Process" by L. T. Sison, A. de Guzman, and J. de Asis
- "VLSI Implementation of a (255, 223) Reed-Solomon Error-Correction Codec" by A.A. Chio and J. Sahagun
- "Design and Implementation of Integrated Circuits for system-on-chip Design Using the Analog and Mixed-Signal Extension of the VHSIC Hardware Description Language" by D.J. M. Sabido IX, M.M. Tabangcura
- "BER Testing of a p/4-DQPSK Modem for Broadband Wireless Access" by A.M. Manlapat, C.G. Santos, J. Ifurung, D.J. M. Sabido IX
- "Practical Techniques for Designing Microstrip Tapped hairpin resonator Filters on FR4 Laminates" by N.G. Toledo
- "Bluetooth Host-Side Protocol Stack Development Using Formal Description Techniques" by I. Wong, B. Galang, M. Caccam, C. Dideles

Financial and Human Resources Management

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Finance

Summary of Allotment, Obligations, Balances (as of December 31, 2001)			
DESCRIPTION	ALLOTMENT	OBLIGATIONS INCURRED	UNOBLIGATED ALLOTMENT/ BALANCES
Personal Services	8,631,854.00	8,549,537.69	82,316.31
Maintenance and other operating expenses	8,662,000.00	8,187,327.75	474,672.25
Capital Outlay	8,412,125.00	4,745,744.83	3,666,380.17
De-obligation of prepayments-per COA circular no. 99-004	167,030.00	167,030.00	-
Total	25,873,009.00	21,649,640.27	4,223,368.73

Staff Profile

ASTI is the smallest attached agency of the DOST in terms of manpower. Overall ASTI has eighty-four (84) personnel as of December 31, 2001. It is allocated 49 plantilla positions but its staff is complemented by positions from Grants-In-Aid Projects.

There are 38 permanent staff which constitute 78% of the plantilla positions. Of this number 21 or 55% are technical staff and 17 are administrative personnel. On the other hand, contractual personnel totaled 46, a number that is 120% greater than the permanent staff in the Institute. Majority of the contractual staff are hired under the COMPETE Program of the Department, in particular, the Virtual Centers of Technology Innovation in Microelectronics and Information Technology.

Year 2001 shows that the number of female employees in ASTI comprises 46% of the total population.

In keeping with its mission to become a national center of excellence, ASTI keeps abreast of developments in its areas of interest through the pursuit of postgraduate education, attendance in trainings, conferences and seminars. As of December 2001, four personnel completed their Masters degrees while another twelve (12) are at various stages in achieving the same. Among the fields of specialization taken are as follows: Electronics and Electrical Engineering, Technology Management, Computer Science and, Management Engineering.

Following is a list of courses and seminars sponsored/conducted by ASTI:

DATE	TITLE OF TRAINING/WORKSHOP/DEMO	PARTICIPANTS
February 14	Lecture on CDMA Technology By: Bienvenido Galang Jr.	20 ASTI Participants
February 15	UP EEE Days Exhibit	
March 7	Lecture on Naming & The Domain Naming System By: Denis F. Villorente	25 ASTI Participants
April 25	Developing the Next Generation Internet in the Philippines Symposium By: PREGINET Team	50 Participants



Financial and Human

May 8	HTML Lecture By: Emily Pagador	15 ASTI Participants
May 10	High Density Interconnect By: Alvin Retamar	15 ASTI Participants
May 24	COMMASIA 2001	20 Participants
June 14	Lecture on Basic Computer Maintenance By: ASTI-MIS Group	20 ASTI Participants
June 28-30	CITEM E-Services Philippines Exhibit Fair	
July 6-20	NSTW 2001	
July 23-27	Object Geode Training	5 ASTI Participants
September 27	Digital & RF-CMOS Technology By: Marga Tabangcura & Lloyd Sison	
	Cadence Training	10 ASTI Participants

Following is a list of the major courses and seminars participated in by the staff.

TECHNICAL TRAINING

DOMESTIC

DATE	COURSE/SEMINAR	ORGANIZER
February 3	Surface Mount Technology Training	Pacific Microwave Corporation
February 15	Course on Accessible Web Design	Computational Science Research Center
April 20	DSP Workshop	National Engineering Center
May 17	I-Planet/E-Commerce Solutions Executives Series	
May 24	Oracle 9i Application Server Web Cache & Wireless	Oracle
May 25	Design Solutions 2001	Cadence
July 20	Seminar/Forum on IPR	National Computer Center
July 30-August 9	Basic Electronics	Meralco Foundation Institute
August 3-31	Microcomputer HW Fundamentals	Meralco Foundation Institute
August 7	Symposium on "Beyond Wappceleration, Winning in the Wireless Revolution"	
August 15	E-Commerce Seminar	National Computer Center
August 29	J2ME Micro-Edition Seminar & Workshop on Sun-Phil Nextel	Sun Microsystems Philippines, Inc.
September 7	Macromedia "Unleash the Power" Seminar	
September 13-15	World Conference on Science & Technology	The Philippine Association for the Advancement of Science, Inc.
September 18-20	Seminar on the Safe Use of Chemicals at Work	Occupational & Safety Office
September 27	PCB Design Tools & Technology	



October 16-17	Conference on ICT for Development	DOST Region VII
November 6-7	Supervisory Development Course II: Powerful Coaching Techniques	MIRDC
November 7-8	Training Course on Technology Marketing & Commercialization	Technology Application and Promotion Institute (TAPI)
November 16-20	Workshop on Innovation & Technology Management	
November 21	Fujitsu Storage Network Workshop	Fujitsu
November 22-23	2001 Cisco Networking Academy Conference (CNAP)	
November 29	2 nd National ECE Conference	University of Santo Tomas

INTERNATIONAL

DATE	COURSE/SEMINAR	ORGANIZER
February 28 – March 2	2001Cadence Design Framework II Training and the 9 th International Conference on Integrated Circuits, Devices and Systems, Singapore	Cadence
November 26 - December 21	Workshop on Distributed Laboratory Instrumentation Systems, Italy	International Centre for Theoretical Physics (ICTP)

NON-TECHNICAL TRAININGS

DATE	COURSE/SEMINAR	ORGANIZER
April 23-May 21	Aircondition & Refrigerator Servicing	Meralco Foundation Institute
June 18-22	Seminar on Supervisory effectiveness for Improved Quality & Productivity	Philippine Training Trade Center
July 9-13	Training Needs Analysis	Development Academy of the Philippines
July 16	Accounting Week Celebration	Philippine Association for Government Budget Administration, Inc.
August 10	Seminar on the Rules in Electronic Evidence	UP-ISMED
September 6	Seminar on Withholding Tax Payers, Remittance Advice	Bureau of Internal Revenue
October 8	Executive Briefing on Improving Customer Satisfaction for Public Agencies	Customer Satisfaction Management
October 23-24	Training on Events Marketing	Management Asian Institute of Management
October 29-30	Sci-Net Philippines Training on Integrated Library Management System (ILMS)	Department of Science & Technology
November 29	God-Centered Governance: Integrity in Action	National Computer Center
December 3-6	Seminar on New Government Accounting System	Department of Science & Technology
December 12	Roundtable Conference on Gender Technology	National Research Council of the Philippines



C h a l l e n g e s

In a planning workshop conducted on March 5, 2001, technical divisions identified their targets and plans for year 2002 and 2003.

The institute's activities will continue to focus on the following program thrusts:

v **Information and Communications Technology (ICT) Program**

ICT Program consists of three components, namely: Advanced Network Research, Wireless Technologies and Network Applications and Software.

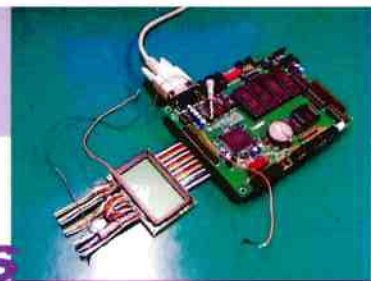
The *Advanced Network Research* component seeks to develop competency in advanced networking technology, services, applications, and architecture; establish a national research and education network; develop, deploy, adapt, and adopt strategic networking technologies, services and applications. This component strengthens the activities of the country in areas such E-commerce, telemedicine and distance education not only through infrastructure development, but also by forging partnerships with research networks outside the Philippines.

The *Wireless Technologies* component aims to develop capability in fundamental design and implementation of industrial grade modules of wireless communications systems to a skill level that is able to produce world-class innovative wireless technologies. This component involves development of devices, components, transmitter and receiver architectures; formulation of wireless broadband solutions; R&D at millimeter and sub-millimeter frequencies; and development of space-qualified communications systems.

The *Network Applications and Software* component aims to develop expertise in software development in network applications to be able to produce marketable software and firmware products. This component deals with R&D on network applications such as E-commerce and related technologies; establishment of a testbed for either business-to-consumer or business-to-business commerce and development of E-commerce software and storefronts. Other network applications being looked into include IP telephony, video/image processing, Bluetooth, artificial intelligence, security and authentication, videoconferencing, among others.

Projects to be undertaken are the following:

1. Development of a High Performance Research and Education Network (Philippine Research, Education and Government Information Network) (on-going)
2. Digital Microwave Radio (on-going)
3. Development of Advanced Broadband wireless System
4. Embedded Multimedia Device (New)
5. Re-engineering of ASTI's Management Information System (Continuing)
6. Bluetooth Host-Side Protocol Stack (on-going)
7. System Software Development for Wireless Mobile Devices
8. Beowulf Clustering (New)



v Microelectronics Program

Microelectronics Program intends to set-up a state-of-the-art microelectronics design facility where one can do quality R&D work; cultivate a skilled workforce adept in IC design through training and exposure to actual design work; and develop system-on-a-chip (SOC) capability within three years. Specific activities being undertaken include research on low-power design and MEMS, study options for design flow using freeware, among others.

Having envisioned to do projects that "cross divisional boundaries", for 2001-2005, all technical divisions of ASTI will be consolidating their efforts to come up with the country's first system-on-a-chip – an integration of all components of wireless devices- for wireless technologies. This is in response to the predicted surge of demand for wireless devices in 2005.

Projects to be undertaken are the following:

1. Microelectronics Design for Philippine Electronics Industry, an Essential Component for Global Competitiveness: Establishment of VCTI Microelectronics Design Laboratory (continuing)
2. Radio Frequency Integrated Circuits (RFIC) (continuing)
3. Digital, Analog & Mixed Signal Components for Signal Processing and Wireless Applications (New)
4. Quality Assurance Project (New)
5. Multilayer Printed Circuit Board Phase II
6. Other PCB Related Studies
7. Customer Study
8. Surface Mount Technology or SMT Improvement
9. Layout Design Study
10. Capability Building Study
11. Microvia Study



Challenges and Directions

v Technology Transfer Program

The **Technology Transfer Program** pursues dynamic assimilation of research results by industry, academe, NGO's and government instrumentality. It aims to transfer R&D outputs and advanced/specialized know-how through: (1) Technology diffusion/commercialization; (2) Collaborative R&D; (3) Conduct of training and seminars; and (4) Industry studies.

To carry out the objectives of the Program, the Business Development Unit will focus on commercializing ASTI researches which have market potential, facilitating internal and external dissemination of technologies developed by the institute and helping build infrastructure for technology transfer.

A GOCC in the future

A challenge that ASTI is currently working on is to become a Government Owned and Controlled Corporation (GOCC). For this, ASTI plans to pursue Phase II of a study conducted by the Development Academy of the Philippines last 2000.

Phase I which was conducted last August 2000 assessed the current situation of ASTI as a research and development agency and initially determined how ASTI can best serve the country. This was participated by ASTI staff, DoST Executives. Former ASTI employees, clients, partners in industry, academe and other GO's.

Per results of the Phase I study, it was recommended by the DOST officials and the Technical Working Group that ASTI could best serve the country as A GOCC with partial support from the government.

Organizational Profile



Office of the Director (OD)

OD oversees the welfare of the agency. It is involved in the planning and monitoring of research programs, collaborative activities within and outside ASTI, direction setting and provision of pertinent services to its technical divisions such as facilitating their partnerships with external agencies.

Under this division are the *Project Management Group (PM)*, *Business Development Unit (BDU)* and the *Management Information System Group (MIS)*. **PM** looks into the internal aspects of the Institute like proposal generation, project planning, resource evaluation and allocation and organizational process improvement activities. **BDU** addresses the external needs of ASTI like developing a strategic marketing program for ASTI technologies, product engineering and prototyping, evaluating marketability of potential and existing technologies and policy advocacy, among others. The **MIS** group is responsible in the maintenance and optimization of the ASTI Network. It is also responsible in the procurement, allocation, monitoring and repair of ASTI's computing resources as well as evaluate, design, develop, implement and document ASTI's information systems.

Finance and Administrative Division (FAD)

FAD provides general support and administrative services such as the management of the Institute's property, supply, financial, human resource and records. It also manages the agency's library of technical books, manuals, software, data books and leading technical journals and magazines.

Communications Engineering Division (CED)

CED seeks to contribute to the emergence and growth of the local communications engineering industry through research and development in communications engineering and its applications for the industry, government, and society. Its efforts include the development of systems for broadband wireless networks with focus on error correction coding, digital signal processing and RF/microwave circuit design; development of system platforms and device drivers for embedded systems supporting data, audio and video applications; and establishment of PREGINET - a national research and education network envisioned to bridge the digital divide between urban and rural communities, to increase competence in S&T capabilities and to promote better delivery of services and information.



Organizational Profile

Computer Software Division (CSD)

CSD envisions to become one of the leading research and development groups in the areas of networked applications development and networked hardware systems engineering. The

group is currently engaged in research in the areas of Bluetooth stack development, with future plans of going into Bluetooth applications development. The group also does research in open source based technologies such as integrated desktop solutions and distributed systems, integration and advocacy with a long term goal of developing solutions in support of the national e-governance thrust and the local software industry.

Microelectronics Division (MED)

MED aims to catalyze advancements in microelectronics research by developing world-class design capabilities promoting a culture of technology awareness and encouraging active involvement from the academe, government RDIs, industry and other sectors. Its R&D efforts are focused on the VCTI-Microelectronics Program, whose major activities involve managing a state-of-the-art design laboratory - ASTI-VCTI Open Laboratory, and establishing the design foundation and know-how vital for the Philippines to enter the global market for integrated circuits.

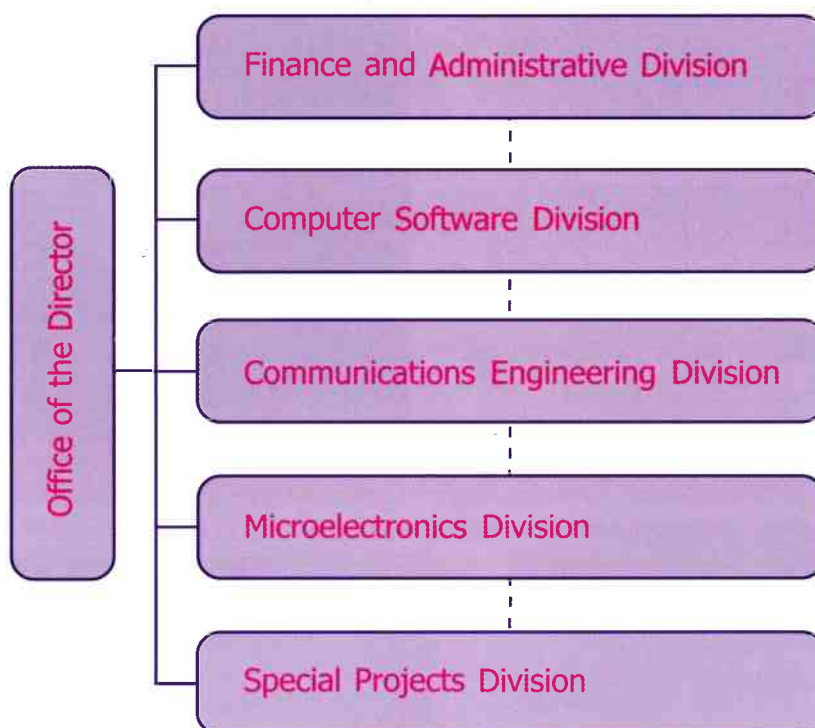
Special Projects Division (SPD)

SPD performs a unique role within the ASTI organization. Its crucial role of bridging R&D and products/technologies is carried out by providing Printed Circuit Board (PCB) layout design and fabrication services to ASTI's technical divisions. These services are critical during the design stage when many iterations of an electronic circuit is required prior to a final design. It also conducts its own particular form of research to enhance its capabilities in the services it offers.

With a vision to provide support and spur development of the local electronics industry to be at par with international standards, SPD offers its PCB layout design and fabrication services as well as conduct trainings on designing electronic devices to the industry and academe.

Under SPD is the Product Design Group whose main function is to develop product prototypes based on ASTI technologies through a market-driven and multi-disciplinary product development process. The team's composition leverages on the diverse technical capabilities of ASTI's researchers. The group also plays a key role in SPD's mission of bridging R&D and products/technologies.

Organizational Chart



ASTI Staff

OD Staff

Dr. Delfin Jay Sabido IX
Narcisa Juvilyn Castaneda
Catherine Vargas
Marie Angela Gopalan
Emma Juco
Maricel Zulaybar

BDU

Pedrito Mangahas
Dolores Silvia Alzona
Ma. Lourdes Trinidad

PM

Leslie Gopalan
Maribeth Macapil

MIS

Peter Banzon
Emily Pagador
Joanna Gonzales
Ivy Cabeza
Francis Ismael
Erwin Ruiz
Micheangelo Liguít
Denis Villorente
Josel Layno
Christian Gueco

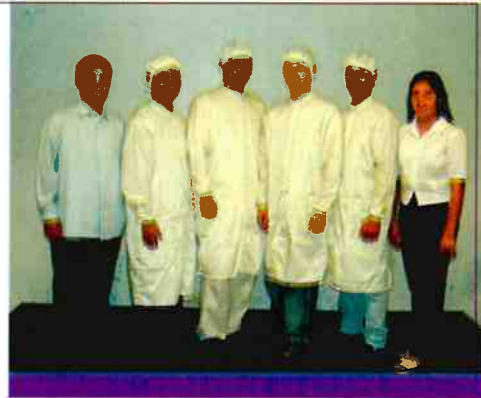


FAD Staff

Atty. Carmencita Echano
Jose Agustin
Gay Concepcion Bugagao
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